Terms used:
Wireless LAN protocol MAC 802.11 frame fragment

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1 Wireless home networks: Performance analysis and enhancement for the current and future IEEE 802.11 MAC protocols
Yang Xiao, Jon Rosdahl
April 2003 **ACM SIGMOBILE Mobile Computing and Communications Review**, Volume 7 Issue 2
Publisher: ACM Press
Full text available: pdf(1.33 MB) Additional Information: full citation, abstract, references, citings

The IEEE 802.11 specifications provide up to 54 Mbps data rates, respectively. The industry is seeking Higher Data Rates (HDR's) over 100Mbps for IEEE 802.11a extension. However, the medium access control (MAC), which they are based upon, is the same. In this paper, we explore the overhead of HDR's to find out whether the MAC is good enough for the increasing data rates and what to expect as the industry seeks higher data rates. We prove that a theoretical throughput upper limit and a theoretica ...

2 Wireless monitoring and denial of service: A framework for wireless LAN monitoring and its applications
Jihwang Yeo, Moustafa Youssef, Ashok Agrawala
October 2004 **Proceedings of the 3rd ACM workshop on Wireless security WiSe '04**
Publisher: ACM Press
Full text available: pdf(1.03 MB) Additional Information: full citation, abstract, references, cited by, index terms

Many studies on measurement and characterization of wireless LANs (WLANs) have been performed recently. Most of these measurements have been conducted from the wired portion of the network based on wired monitoring (e.g. sniffer at some wired point) or SNMP statistics. More recently, *wireless monitoring*, the traffic measurement from a wireless vantage point, is also widely adopted in both wireless research and commercial WLAN management product development. Wireless monitoring technique c ...

Keywords: anomaly, security, traffic characterization, wireless LAN, wireless monitoring

3 MAC: Design and analysis of grouping-based DCF (GB-DCF) scheme for the MAC layer enhancement of 802.11 and 802.11n
Kuo-Chang Ting, Mao-yu Jan, Sung-huai Hsieh, Hsiu-Hui Lee, Feipei Lai
October 2006 **Proceedings of the 9th ACM international symposium on Modeling**

analysis and simulation of wireless and mobile systems MSWiM '06
Publisher: ACM Press
Full text available: pdf(402.08 KB) Additional Information: full citation, abstract, references, index terms

The 802.11 has emerged as the prominent wireless LAN technology as the mobile computing devices such as notebooks and PDA have replaced the desktop computers to be the main trend products. However, if the number of active stations is large, that is high-loading condition for the legacy DCF of 802.11, the capacity will be very low due to *high collision costs*. In this paper, *we introduce the TDMA concept to partition all numerous active stations into several groups to avoid all stations ...*

***Keywords**: 802.11n, CP, DCF, GB-DCF, MAC, PC, PCF*

4 Comparative study of 802.11 DCF and its modification in the presence of noise
Andrey Lyakhov, Vladimir Vishnevsky
November 2005 **Wireless Networks**, Volume 11 Issue 6
Publisher: Kluwer Academic Publishers
Full text available: pdf(1.15 MB) Additional Information: full citation, abstract, references, index terms

IEEE 802.11 specifies a technology for wireless local area networks (LANs) and mobile networking. In this paper, we present an analytical method of estimating the saturation throughput of a 802.11 wireless LAN in the presence of noise, which distorts transmitted frames. With the Distributed Coordination Function (DCF) being the fundamental access mechanism in the IEEE 802.11 MAC protocol, sequential attempts to transfer by every station are separated by backoff intervals. Besides the standard ba ...

Keywords: IEEE 802.11 LAN, analytical method, backoff rule, noise-induced distortion, rejection probability, saturation throughput

5 A New MAC Scheme for Very High-Speed WLANs
Tianji Li, Qiang Ni, David Malone, Douglas Leith, Yang Xiao, Thierry Turletti
June 2006 **Proceedings of the 2006 International Symposium on on World of Wireless, Mobile and Multimedia Networks WOWMOM '06**
Publisher: IEEE Computer Society
Full text available: pdf(363.24 KB) Additional Information: full citation, abstract, index terms

We consider the medium access control (MAC) layer for very high-speed Wireless LANs, which is designed to support rich multimedia applications such as highdefinition television. In such networks, the physical (PHY) layer data rate is proposed to exceed 216Mbps. The legacy MAC layer, however, greatly restricts the performance improvement due to its overhead. It has been shown that MAC utilizes less than 20% of the transportation ability provided by the PHY layer. To mitigate this inefficiency, we ...

6 Power & QoS constrained networks: A differentiated distributed coordination function MAC protocol for cluster-based wireless ad hoc networks
Luciano Bononi, Luca Budriesi, Danilo Blasi, Vincenzo Cacace, Luca Casone, Salvatore Rotolo
October 2004 **Proceedings of the 1st ACM international workshop on Performance evaluation of wireless ad hoc, sensor, and ubiquitous networks PE-WASUN '04**
Publisher: ACM Press
Full text available: pdf(294.48 KB) Additional Information: full citation, abstract, references, index terms

Wireless Mobile Ad Hoc Networks (MANETs) have been defined as infrastructure-less networks, including mobile and fixed nodes relying on peer-to-peer protocols and management. To support more reliable communications, efficient network management

and high resources' utilization, distributed clustering protocols have been considered as a solution to introduce some kind of hierarchy in MANETs by means of dynamic and adaptive virtual infrastructures. In clustering schemes, the different node-roles, a ...

Keywords: IEEE 802.11 MAC protocols, cluster-based architecture, cross layering, differentiated accesses, wireless ad hoc networks

7 MR²RP: the multi-rate and multi-range routing protocol for IEEE 802.11 ad hoc wireless networks

Shiann-Tsong Sheu, Yihjia Tsai, Jenhui Chen
March 2003 **Wireless Networks**, Volume 9 Issue 2
Publisher: Kluwer Academic Publishers

Full text available: pdf(252.69 KB) Additional Information: full citation, abstract, references, citings, index terms

This paper discusses the issue of routing packets over an IEEE 802.11 *ad hoc* wireless network with multiple data rates (1/2/5.5/11 Mb/s). With the characteristics of modulation schemes, the data rate of wireless network is inversely proportional with the transmission distance. The conventional shortest path of minimum-hops approach will be no longer suitable for the contemporary multi-rate/multi-range wireless networks (MR²WN). In this paper, we will propose an efficient delay- ...

Keywords: ad hoc, local area network (LAN), medium access control (MAC), routing, wireless

8 Wireless LAN optimizations: MiSer: an optimal low-energy transmission strategy for IEEE 802.11a/h

Daji Qiao, Sunghyun Choi, Amit Jain, Kang G. Shin
September 2003 **Proceedings of the 9th annual international conference on Mobile computing and networking MobiCom '03**
Publisher: ACM Press

Full text available: pdf(248.70 KB) Additional Information: full citation, abstract, references, cited by, index terms

Reducing the energy consumption by wireless communication devices is perhaps the most important issue in the widely-deployed and exponentially-growing IEEE 802.11 Wireless LANs (WLANs). TPC (Transmit Power Control) and PHY (physical layer) rate adaptation have been recognized as two most effective ways to achieve this goal. The emerging 802.11h standard, which is an extension to the current 802.11 MAC and the high-speed 802.11a PHY, will provide a structured means to support intelligent TPC.In t ...

Keywords: IEEE 802.11a/h, MiSer, PHY rate adaptation, TPC

9 Packetized voice transmission using RT-MAC, a wireless real-time medium access control protocol

Rusty O. Baldwin, Nathaniel J. Davis, Scott F. Midkiff, Richard A. Raines
July 2001 **ACM SIGMOBILE Mobile Computing and Communications Review**, Volume 5 Issue 3
Publisher: ACM Press

Full text available: pdf(1.39 MB) Additional Information: full citation, abstract, references, index terms

RT-MAC is a simple, elegant, and robust medium access control (MAC) protocol for use in transmitting real-time data in point-to-point *ad hoc* wireless local area networks (WLANs). Our enhancement of IEEE 802.11, real-time MAC (RT-MAC), dramatically reduces missed

deadlines and packet collisions while increasing throughput by selectively discarding packets and sharing station state information. For example, RT-MAC is able to successfully transmit 40 2-way voice conversations in addition to ...

10 Medium access control with coordinated adaptive sleeping for wireless sensor networks

Wei Ye, John Heidemann, Deborah Estrin
June 2004 **IEEE/ACM Transactions on Networking (TON)**, Volume 12 Issue 3
Publisher: IEEE Press

Full text available: pdf(349.53 KB) Additional Information: full citation, abstract, references, citings, index terms

This paper proposes S-MAC, a medium access control (MAC) protocol designed for wireless sensor networks. Wireless sensor networks use battery-operated computing and sensing devices. A network of these devices will collaborate for a common application such as environmental monitoring. We expect sensor networks to be deployed in an ad hoc fashion, with nodes remaining largely inactive for long time, but becoming suddenly active when something is detected. These characteristics of sensor networks a ...

Keywords: energy efficiency, medium access control (MAC), sensor network, wireless network

11 Improving performance of MAC layer by using congestion control/avoidance methods in wireless network

Song Ci, Hamid Sharif, Guevara Noubir
March 2001 **Proceedings of the 2001 ACM symposium on Applied computing SAC '01**
Publisher: ACM Press
Full text available: pdf(370.33 KB) Additional Information: full citation, references, index terms

Keywords: IEEE802.11, MAC, QoS, adaptive algorithms, wireless LAN

12 OAR: an opportunistic auto-rate media access protocol for ad hoc networks

B. Sadeghi, V. Kanodia, A. Sabharwal, E. Knightly
January 2005 **Wireless Networks**, Volume 11 Issue 1-2
Publisher: Kluwer Academic Publishers
Full text available: pdf(408.15 KB) Additional Information: full citation, abstract, references, index terms

The IEEE 802.11 wireless media access standard supports multiple data rates at the physical layer. Moreover, various auto rate adaptation mechanisms at the medium access layer have been proposed to utilize this multi-rate capability by automatically adapting the transmission rate to best match the channel conditions. In this paper, we introduce the Opportunistic Auto Rate (OAR) protocol to better exploit durations of high-quality channels conditions. The key mechanism of the OAR protocol is to o ...

Keywords: distributed, media access, multi-rate IEEE 802.11, opportunistic, scheduling

13 Wireless LANs and wireless PANs symposium: MAC protocols: Contention-free access protocol based energy-efficient transmission for wireless pans

Yang-Ick Joo, Yeonwoo Lee, Gi-Chul Yang, Emad Al-Susa, Seong-Ro Lee
August 2007 **Proceedings of the 2007 international conference on Wireless communications and mobile computing IWCMC '07**

Publisher: ACM Press
Full text available: pdf(790.90 KB) Additional Information: full citation, abstract, references, index terms

Energy-efficient transmission technique is a very essential performance decision factor for maximizing the lifetime of energy-constrained wireless devices such as Wireless Personal Area Network (WPAN) devices. Moreover, if the WPAN is operated in conjunction with a TDMA based scheme, the assurance of QoS requirements in the actual physical transmission at each allocated time slot is another important factor to be satisfied. We therefore propose an energy-efficient and QoS aware transmission s ...

Keywords: WPAN, contention free access protocol, energy efficient

14 CROMA: an enhanced slotted MAC protocol for MANETs
Marceau Coupechoux, Bruno Baynat, Christian Bonnet, Vinod Kumar
February 2005 **Mobile Networks and Applications**, Volume 10 Issue 1-2
Publisher: Kluwer Academic Publishers
Full text available: pdf(781.36 KB) Additional Information: full citation, abstract, references, index terms

TDMA based MAC protocols can provide a very good utilization of the shared radio resources, especially at high input loads, in synchronized mobile ad hoc networks (MANETs). Global positioning systems like GPS or GALLILEO should provide a very good timing accuracy for synchronization of nodes. This paper presents a new medium access protocol for mobile ad hoc networks, called CROMA. CROMA is collision-free and receiver-oriented. It operates in a slotted environment, in a dynamic and distributed w ...

Keywords: MAC, TDMA, conflict-free protocol, dynamic slot allocation, mobile ad hoc networks, scheduling

15 MAC: Dynamic packet aggregation to solve performance anomaly in 802.11 wireless networks
Tahiry Razafindralambo, Isabelle Guérin Lassous, Luigi Iannone, Serge Fdida
October 2006 **Proceedings of the 9th ACM international symposium on Modeling analysis and simulation of wireless and mobile systems MSWiM '06**
Publisher: ACM Press
Full text available: pdf(238.17 KB) Additional Information: full citation, abstract, references, index terms

In the widely used 802.11 standard, the so-called *performance anomaly* is a well-known issue. Several works have tried to solve this problem by introducing mechanisms such as packet fragmentation, backoff adaptation, or packet aggregation during a fixed time interval. In this paper, we propose a novel approach solving the performance anomaly problem by packet aggregation using a dynamic time interval, which depends on the busy time of the wireless medium. Our solution differs from other pr ...

Keywords: 802.11, algorithms, performance anomaly

16 Performance study of access control in wireless LANs—IEEE 802.11 DFWMAC and ETSI RES 10 Hiperlan
Jost Weinmiller, Morten Schläger, Andreas Festag, Adam Wolisz
June 1997 **Mobile Networks and Applications**, Volume 2 Issue 1
Publisher: Kluwer Academic Publishers
Full text available: pdf(499.03 KB) Additional Information: full citation, abstract, references, citings, index terms

Currently two projects are on their way to standardize physical layer and medium access

control for wireless LANs—IEEE 802.11 and ETSI RES 10 Hiperlan. This paper presents an introduction to both projects focussing on the applied access schemes. Further we will present our simulation results, analyzing the performance of both access protocols depending on the number of stations and on the packet size, evaluating them regarding their capability to support QoS parameters, regarding the ...

17 An efficient cross layer scheduler for multimedia traffic in wireless local area networks with IEEE 802.11e HCCA

Claudio Cicconetti, Luciano Lenzini, Enzo Mingozzi, Giovanni Stea

July 2007 **ACM SIGMOBILE Mobile Computing and Communications Review**, Volume 11 Issue 3

Publisher: ACM

Full text available: pdf(1.13 MB) Additional Information: full citation, abstract, references

This paper proposes a scheduling algorithm, namely Wireless Timed Token Protocol (WTTP), for the Hybrid Coordination Function (HCF) Controlled Channel Access (HCCA) in IEEE 802.11e. WTTP provides traffic streams with a minimum reserved rate, as required by the standard, and it accounts for two types of traffic streams simultaneously, depending on the corresponding application: constant bit rate, which are served according to their rate, and variable bit rate traffic streams. The latter are gu ...

18 Contention-based airtime usage control in multirate IEEE 802.11 wireless LANs

Chun-Ting Chou, Kang G. Shin, Sai Shankar N.

December 2006 **IEEE/ACM Transactions on Networking (TON)**, Volume 14 Issue 6

Publisher: IEEE Press

Full text available: pdf(2.15 MB) Additional Information: full citation, abstract, references, index terms

In a multirate wireless LAN, wireless/mobile stations usually adapt their transmission rates to the channel condition. It is difficult to control each station's usage of network resources since the shared channel can be overused by low transmission-rate stations. To solve this problem, we propose a distributed control of stations' airtime usage which 1) always guarantees each station to receive a specified share of airtime, and 2) keeps service for individual stations unaffected by other station ...

Keywords: medium access control, resource allocation, wireless LAN

19 Wireless LAN optimizations: Improving protocol capacity with model-based frame scheduling in IEEE 802.11-operated WLANs

Hwangnam Kim, Jennifer C. Hou

September 2003 **Proceedings of the 9th annual international conference on Mobile computing and networking MobiCom '03**

Publisher: ACM Press

Full text available: pdf(480.66 KB) Additional Information: full citation, abstract, references, cited by, index terms

In this paper, we develop a model-based frame scheduling scheme, called *MFS*, to enhance the capacity of IEEE 802.11-operated wireless LANs (WLANs). In MFS each node estimates the current network status by keeping track of the number of collisions it encounters between its two consecutive successful frame transmissions, and, based on the the estimated information, computes the current network utilization. The result is then used to determine a scheduling delay that is introduced (with the ...

Keywords: IEEE 802.11, performance analysis, protocol enhancement, wireless LANs (WLANs)

20 Wireless networks: Incentive compatible medium access control in wireless networks

Nassir BenAmmar, John S. Baras

October 2006 **Proceeding from the 2006 workshop on Game theory for communications and networks GameNets '06**

Publisher: ACM Press

Full text available: pdf(325.99 KB) Additional Information: full citation, abstract, references, index terms

The current IEEE 802.11 medium access control standard is being deployed in coffee shops, in airports and even across major cities. The terminals accessing these wi-fi access points do not belong to the same entity, as in corporate networks, but are usually individually owned and operated. Entities sharing these network resources have no incentive in following protocol rules other than to optimize their overall utility, usually a function of throughput and delay. We briefly discuss shortfalls of ...

Keywords: Vickrey auction, medium access control, wireless networks

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Terms used:
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21 Mesh technology enabling ubiquitous wireless networks: invited paper

Guido R. Hiertz, Sebastian Max, Erik Weiß, Lars Berlemann, Dee Denteneer, Stefan Mangold
August 2006 **Proceedings of the 2nd annual international workshop on Wireless internet WICON '06**
Publisher: ACM Press
Full text available: pdf(470.65 KB) Additional Information: full citation, abstract, references, index terms

Today's wireless networking technology provides high data rates. With IEEE 802.11n products, data rates beyond 500^{Mb}/s are soon feasible for *Wireless Local Area Network (WLAN)*. Due to a standstill in standardization the project IEEE 802.15.3a it was disbanded in 2006. Companies are pushing therefore their own solutions to the *Wireless Personal Area Network (WPAN)* market. Shortly, 480^{Mb}/s will be available for WPAN applications. For lar ...

Keywords: IEEE 802.11s, IEEE 802.15.5, IEEE 802.16j, WLAN, WMAN, WPAN, wireless mesh networks

22 Papers: Wireless data communications using DECT air interface

António Muchaxo, Alexandre Sousa, Nuno Pereira, Helena Sarmento
April 1999 **ACM SIGCOMM Computer Communication Review**, Volume 29 Issue 2
Publisher: ACM Press
Full text available: pdf(1.25 MB) Additional Information: full citation, abstract, references, citings

DECT is an approved ETSI standard for cordless communications, defined as a general radio access technology that can be used as the air interface to any network. In addition to the well-established voice service, it supports data communications. DECT currently addresses low bit rates, but additional modulation options have recently been included for high-speed, up to 2Mbps. In this paper, we describe the hardware and software design of an entire wireless communications system to be used in SOHO ...

23 Comparing energy-saving MAC protocols for wireless sensor networks

G. P. Halkes, T. van Dam, K. G. Langendoen
October 2005 **Mobile Networks and Applications**, Volume 10 Issue 5
Publisher: Kluwer Academic Publishers
Full text available: pdf(1.05 MB) Additional Information: full citation, abstract, references, index terms

Applications for wireless sensor networks have notably different characteristics and requirements from standard WLAN applications. Low energy consumption is the most important consideration. The low message rate that is typical for sensor network applications and the relaxed latency requirements allow for significant reductions in energy consumption of the radio. In this article we study the energy saved by two MAC protocols optimized for wireless sensor networks, S-MAC and T-MAC, in comparison ...

Keywords: duty cycle, energy efficiency, idle listening, medium access control, simulation

24 A-MAC: adaptive medium access control for next generation wireless terminals

Mehmet C. Vuran, Ian F. Akyildiz

June 2007 **IEEE/ACM Transactions on Networking (TON)**, Volume 15 Issue 3

Publisher: IEEE Press

Full text available: pdf(843.24 KB) Additional Information: full citation, abstract, references, index terms

Next Generation (NG) wireless networks are envisioned to provide high bandwidth to mobile users via bandwidth aggregation over heterogeneous wireless architectures. NG wireless networks, however, impose challenges due to their architectural heterogeneity in terms of different access schemes, resource allocation techniques as well as diverse quality of service requirements. These heterogeneities must be captured and handled dynamically as mobile terminals roam between different wireless archit ...

Keywords: adaptive medium access control, heterogeneous QoS requirements, heterogeneous networks, next generation wireless networks, virtual cube concept

25 BlueSky: a cordless networking solution for palmtop computers

Pravin Bhagwat, Ibrahim Korpeoglu, Chatschik Bisdikian, Mahmoud Naghshineh, Satish K. Tripathi

August 1999 **Proceedings of the 5th annual ACM/IEEE international conference on Mobile computing and networking MobiCom '99**

Publisher: ACM Press

Full text available: pdf(1.31 MB) Additional Information: full citation, references, index terms

26 FHCF: a simple and efficient scheduling scheme for IEEE 802.11e wireless LAN

Pierre Ansel, Qiang Ni, Thierry Turletti

June 2006 **Mobile Networks and Applications**, Volume 11 Issue 3

Publisher: Kluwer Academic Publishers

Full text available: pdf(349.38 KB) Additional Information: full citation, abstract, references, index terms

The IEEE 802.11e medium access control (MAC) layer protocol is an emerging standard to support quality of service (QoS) in 802.11 wireless networks. Some recent work shows that the 802.11e hybrid coordination function (HCF) can improve significantly the QoS support in 802.11 networks. A simple HCF referenced scheduler has been proposed in the 802.11e which takes into account the QoS requirements of flows and allocates time to stations on the basis of the mean sending rate. As we show in this pap ...

Keywords: IEEE 802.11e, WLAN, medium access control (MAC), quality of service (QoS)

27 Medium access control: Exploiting medium access diversity in rate adaptive wireless LANs

Zhengrong Ji, Yi Yang, Junlan Zhou, Mineo Takai, Rajive Bagrodia
September 2004 **Proceedings of the 10th annual international conference on Mobile computing and networking MobiCom '04**
Publisher: ACM Press
Full text available: pdf(404.09 KB) Additional Information: full citation, abstract, references, citings, index terms

Recent years have seen the growing popularity of multi-rate wireless network devices (e.g., 802.11a cards) that can exploit variations in channel conditions and improve overall network throughput. Concurrently, rate adaptation schemes have been developed that selectively increase data transmissions on a link when it offers good channel quality. In this paper, we propose a *Medium Access Diversity* (MAD) scheme that leverages the benefits of rate adaptation schemes by aggressively exploiting ...

Keywords: medium access, multiuser diversity, scheduling, wireless LAN

28 A practical cross-layer mechanism for fairness in 802.11 networks
Joseph Dunn, Michael Neufeld, Anmol Sheth, Dirk Grunwald, John Bennett
February 2006 **Mobile Networks and Applications**, Volume 11 Issue 1
Publisher: Kluwer Academic Publishers
Full text available: pdf(1.17 MB) Additional Information: full citation, abstract, references, index terms

Many companies, organizations and communities are providing wireless hotspots that provide networking access using 802.11b wireless networks. Since wireless networks are more sensitive to variations in bandwidth and environmental interference than wired networks, most networks support a number of transmission rates that have different error and bandwidth properties. Access points can communicate with multiple clients running at different rates, but this leads to unfair bandwidth allocation. If a ...

Keywords: 802.11, cross-layer, quality of service, wireless

29 A real-time medium access control protocol for ad hoc wireless local area networks
Rusty O. Baldwin, Nathaniel J. Davis, Scott F. Midkiff
April 1999 **ACM SIGMOBILE Mobile Computing and Communications Review**, Volume 3 Issue 2
Publisher: ACM Press
Full text available: pdf(1.15 MB) Additional Information: full citation, abstract, references, citings

We develop and analyze a simple, elegant medium access control (MAC) protocol for use in transmitting real-time data in point to point *ad hoc* wireless local area networks (WLANs). Our enhancement of IEEE 802.11, real-time MAC (RT-MAC), achieves dramatic reductions in mean delay, missed deadlines, and packet collisions by selectively discarding packets and sharing station state information. For example, in a 50 station network with a normalized offered load of 0.7, mean delay is reduced fr ...

30 Interference analysis and transmit power control in IEEE 802.11a/h wireless LANs
Daji Qiao, Sunghyun Choi, Kang G. Shin
October 2007 **IEEE/ACM Transactions on Networking (TON)**, Volume 15 Issue 5
Publisher: IEEE Press
Full text available: pdf(1.07 MB) Additional Information: full citation, abstract, references, index terms

Reducing the energy consumption by wireless communication devices is perhaps the most important issue in the widely deployed and dramatically growing IEEE 802.11 WLANs (wireless local area networks). TPC (transmit power control) has been recognized as one of the effective ways to achieve this goal. In this paper, we study the emerging 802.11a/h systems that provide a structured means to support intelligent TPC. Based on a rigorous

analysis of the relationship among different radio ranges and ...

Keywords: IEEE 802.11a/h, MiSer, PHY rate adaptation, TPC, interference analysis, transmit power control

31 Effective Co-Verification of IEEE 802.11a MAC/PHY Combining Emulation and Simulation Technology

IL-Gu Lee, Seung-Beom Lee, Sin-Chong Park

April 2005 **Proceedings of the 38th annual Symposium on Simulation ANSS '05**

Publisher: IEEE Computer Society

Full text available: pdf(358.72 KB) Additional Information: full citation, abstract, index terms

This work presents a system architecture and effective co-verification methodologies for the IEEE 802.11a Medium Access Control (MAC) layer/Physical (PHY) layer implementation. The architecture modeling includes hardware/software partitioning of a total system based on timing measurements from the C/C++ and Verilog design, and analysis of real-time requirements specified in the standard. The system is built on an evaluation platform that contains a Xilinx Virtex-II FPGA and an Altera Excalibur A ...

32 Media Access Control for Ad Hoc Networks: Opportunistic media access for multirate ad hoc networks

B. Sadeghi, V. Kanodia, A. Sabharwal, E. Knightly

September 2002 **Proceedings of the 8th annual international conference on Mobile computing and networking MobiCom '02**

Publisher: ACM Press

Full text available: pdf(305.75 KB) Additional Information: full citation, abstract, references, cited by, index terms

The IEEE 802.11 wireless media access standard supports multiple data rates at the physical layer. Moreover, various auto rate adaptation mechanisms at the medium access layer have been proposed to utilize this multi-rate capability by automatically adapting the transmission rate to best match the channel conditions. In this paper, we introduce the Opportunistic Auto Rate (OAR) protocol to better exploit durations of high-quality channels conditions. The key mechanism of the OAR protocol is to o ...

Keywords: *ad hoc* networks, IEEE 802.11, medium access, scheduling, wireless channels

33 Adaptive power saving mechanisms for DCF in IEEE 802.11

Shihong Zou, Haitao Wu, Shiduan Cheng

October 2005 **Mobile Networks and Applications**, Volume 10 Issue 5

Publisher: Kluwer Academic Publishers

Full text available: pdf(1.04 MB) Additional Information: full citation, abstract, references, index terms

Distributed Coordination Function (DCF) is the basis of IEEE 802.11 MAC sublayer. To improve energy efficiency, IEEE 802.11 has specified power saving mechanism (PSM) for DCF. However, the performance of PSM degrades seriously when load is heavy. In this paper we first analyze the reason of performance degradation, and then propose two adaptive mechanisms: PSM+ and fairPSM+. Numerous simulation results have shown that these two mechanisms can achieve high performance with heavy load and still ge ...

Keywords: DCF, energy efficient, power saving mechanism, wireless LAN, 802.11

34 Wireless network security I: Common data security network (CDSN)

Aftab Ahmad, Mona El-Kadi Rizvi, Stephan Olariu
October 2005 **Proceedings of the 1st ACM international workshop on Quality of service & security in wireless and mobile networks Q2SWinet '05**
Publisher: ACM Press
Full text available: pdf(287.12 KB) Additional Information: full citation, abstract, references, index terms

We present the idea of using a separate network that processes and enforces security in a data network. We briefly discuss various components of such a network, called common data security network (CDSN). We use the example of the IEEE 802.11i to determine one of the link level metrics of the proposed network, the fractional overhead for IEEE 802.1X and temporal key integrity protocol (TKIP).

Keywords: IEEE 802.11i, TKIP, common data security, security architecture, security plane, wireless LANs

35 Exploiting path diversity in mobile systems: Divert: fine-grained path selection for wireless LANs

Allen Miu, Godfrey Tan, Hari Balakrishnan, John Apostolopoulos
June 2004 **Proceedings of the 2nd international conference on Mobile systems, applications, and services MobiSys '04**
Publisher: ACM Press
Full text available: pdf(913.28 KB) Additional Information: full citation, abstract, references, citings, index terms

The performance of Wireless Local Area Networks (WLANs)often suffers from link-layer frame losses caused by noise, interference, multipath, attenuation, and user mobility. We observe that frame losses often occur in bursts and that three of the five main causes of frame losses -- multipath, attenuation, mobility--depends on the transmission path traversed between an access point (AP)and a client station.In a typical WLAN deployment, different transmission paths to a client exist in places where ...

Keywords: 802.11, mobile systems, path diversity, wireless LAN

36 Wireless networking security: Security flaws in 802.11 data link protocols

Nancy Cam-Winget, Russ Housley, David Wagner, Jesse Walker
May 2003 **Communications of the ACM**, Volume 46 Issue 5
Publisher: ACM Press
Full text available: pdf(98.86 KB) html(27.46 KB) Additional Information: full citation, abstract, references, citings, index terms

Understanding the difficulties in security protocol design and attempting to relocate the struggle between hacker and defender to a different protocol layer.

37 An accurate technique for measuring the wireless side of wireless networks

Jihwang Yeo, Moustafa Youssef, Tristan Henderson, Ashok Agrawala
June 2005 **Papers presented at the 2005 workshop on Wireless traffic measurements and modeling WiTMeMo '05**
Publisher: USENIX Association
Full text available: pdf(290.41 KB) Additional Information: full citation, abstract, references, cited by, index terms

Wireless monitoring (WM) is a passive approach for capturing wireless-side traffic with rich MAC/PHY layer information. WM can suffer, however, from low capture performance, i.e., high measurement loss, due to the unreliable wireless medium. In this paper, we

experimentally show that WM can perform reliable and accurate measurements on wireless traffic, in actual, non-ideal channel conditions.We demonstrate how to increase capture performance by merging traces from multiple monitoring devices. T ...

38 PPR: partial packet recovery for wireless networks

Kyle Jamieson, Hari Balakrishnan

August 2007 **ACM SIGCOMM Computer Communication Review , Proceedings of the 2007 conference on Applications, technologies, architectures, and protocols for computer communications SIGCOMM '07**, Volume 37 Issue 4

Publisher: ACM Press

Full text available: pdf(977.43 KB) Additional Information: full citation, abstract, references, index terms

Bit errors occur in wireless communication when interference or noise overcomes the coded and modulated transmission. Current wireless protocols may use forward error correction (FEC) to correct some small number of bit errors, but generally retransmit the whole packet if the FEC is insufficient. We observe that current wireless mesh network protocols retransmit a number of packets and that most of these retransmissions end up sending bits that have already been received multiple times, wasti ...

Keywords: 802.11, ARQ, layering, synchronization, wireless, zigbee

39 Dynamic adaptation policies to improve quality of service of real-time multimedia applications in IEEE 802.11e WLAN networks

Naomi Ramos, Debashis Panigrahi, Sujit Dey

August 2007 **Wireless Networks**, Volume 13 Issue 4

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With the increased popularity of wireless broad-band networks and the growing demand for multimedia applications, such as streaming video and teleconferencing, there is a need to support diverse multimedia services over the wireless medium. In order to efficiently address these diverse needs, efforts have been pursued to provide Quality of Service (QoS) mechanisms for medium access, resulting in a standard called IEEE 802.11e. One of the enhancements proposed in IEEE 802.11e is a polling-base ...

Keywords: IEEE 802.11e, quality of service, service level agreements, video streaming, wireless LAN

40 Management and Diagnosis Architecture for a Large-Scale Public WLAN

Seongkwan Kim, Se-kyu Park, Sunghyun Choi, Jaehwan Lee, Hanwook Jung

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In Korea, a large-scale IEEE 802.11b-based public wireless LAN (WLAN) service, called NESPOT, has been in operation by Korea Telecom (KT) across the country during the last four years. Along with a fast growth of the service, however, the service quality problems have been encountered. In order to manage and overcome such problems properly, we have developed a diagnostic tool, which is composed of a database for wireless connection-related dissatisfaction, a log collector and analyzer, and a mec ...